

CLAIMS

1. (Previously presented) A method for forming an image by means of an image sensor with
5 an active area containing a plurality of pixels, comprising the steps of:

(a) in two interrogation runs performed on a first subset of pixels, resetting the first subset of
10 pixels, exposing the first subset of pixels and reading out the output value(s) of the first subset of
pixels, wherein in said two interrogation runs, a longer exposure and a shorter exposure are
performed;

(b) combining said output values into a first combined output value by means of a merging
function which is truly monotonic, continuous and continuously differentiable in all said output
values, wherein said merging function has the following properties:

15 (i) preference is given to the output value obtained from the longer exposure when said
output values or a combination of said output values lie beneath a given lower limit;

20 (ii) preference is given to the output value obtained from the shorter exposure when said
output values or a combination of said output values lie above a given upper limit;

(iii) said merging function increases truly monotonically in said output values when said
output values lie between said lower limit and said upper limit; and

25 (c) repeating steps (a) and (b) for at least one second subset of pixels.

2. (Previously presented) The method according to claim 1, wherein said subsets are
rows, columns or single pixels of the image sensor.

30 3. (Previously presented) The method according to claim 1, wherein prior to step (a), the

active area of the image sensor is partitioned into subsets with equal numbers of pixels.

4. (Previously presented) The method according to claim 1, wherein in step (a), at least one of said output value(s) is/are stored.

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5. (Previously presented) The method according to claim 1, wherein steps (a) and (b) are repeated until each pixel has been read out at least once.

10 6. (Previously presented) The method according to claim 1, wherein performing steps (a) and/or (b) on one subset of pixels temporally overlaps with performing steps (a) and/or (b) on the following subset of pixels.

7-10. (Canceled)

15 11. (previously presented) A method for forming an image by means of an image sensor with an active area containing a plurality of pixels, comprising:

20 (a) in n interrogation runs performed on a first subset of pixels, where n is an integer and $n \geq 2$, resetting the first subset of pixels, exposing the first subset of pixels and reading out the output value(s) of the first subset of pixels,

(b) combining said output values into a first combined output value;

(c) repeating steps (a) and (b) for at least one second subset of pixels;

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wherein in step (b), said output values are combined into a combined output value by means of a merging function which is truly monotonic, continuous and continuously differentiable in all said output values, wherein $n = 2$ for subsets of pixels, wherein in step (a), a longer exposure and a shorter exposure are performed wherein said merging function has the following properties:

(i) preference is given to the output value obtained from the longer exposure when said output values or a combination of said output values lie beneath a given lower limit; .

5 (ii) preference is given to the output value obtained from the shorter exposure when said output values or a combination of said output values lie above a given upper limit;

(iii) said merging function increases truly monotonically in said output values when said output values lie between said lower limit and said upper limit.

10 12. (Amended) The method Method according to claim 11, wherein said merging function is defined by

$$f(x_1, x_2) = \sqrt{cx_1^2 + (1-c)x_2^2} \text{ with } c = (x_1 - x_{up}) / (x_{low} - x_{up})$$

for $x_{low} < x_1 < x_{up}$.

15 13. (Previously presented) The method according to claim 1, wherein said image sensor is an active pixel sensor.

14. (Previously presented) The method according to claim 1, wherein said output values are combined using a general-purpose digital computation unit, a dedicated digital or analog computation unit or a lookup table.

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15. (Previously presented) Image sensor for performing the method according to claim 1, comprising an active area containing a plurality of pixels whereby at least two subsets of pixels

allow an individual interrogation; means for individually interrogating subsets of pixels; means for combining output values of said subsets into combined output values; and means for electrically outputting said combined output values.

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16. (Original) Image sensor according to claim 15, said image sensor being an active pixel sensor (APS).

10 17. (Previously presented) The method according to claim 1, wherein said merging function is defined by

$$f(x_1, x_2) = \sqrt{cx_1^2 + (1-c)x_2^2} \text{ with } c = (x_1 - x_{up}) / (x_{low} - x_{up})$$

for $x_{low} < x_1 < x_{up}$.

15 18. (Amended) A method for forming an image by means of an image sensor with an active area containing a plurality of pixels, comprising the steps of:

20 (a) in two interrogation runs performed on a first subset of pixels, resetting the first subset of pixels, exposing the first subset of pixels and reading out the output value(s) of the first subset of pixels, wherein in said two interrogation runs, a longer exposure and a shorter exposure are performed;

(b) combining said output values into a first combined output value; and

(c) repeating steps (a) and (b) for at least one second subset of pixels;

wherein during said longer exposure of ~~one~~ said first subset, steps (b) are performed for ~~all other~~ said at least one second subsets.

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19. (previously presented) The method according to claim 18, wherein said subsets are rows, columns or single pixels of the image sensor.

10 20. (previously presented) The method according to claim 18, wherein prior to step (a), the active area of the image sensor is partitioned into subsets with equal numbers of pixels.

21. (previously presented) The method according to claim 18, wherein in step (a), at least one of said output value(s) is/are stored.

15 22. (previously presented) The method according to claim 18, wherein steps (a) and (b) are repeated until each pixel has been read out at least once.

23. (previously presented) The method according to claim 18, wherein said image sensor is an active pixel sensor (APS).

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24. (previously presented) The method according to claim 18, wherein said output values are combined using a general-purpose digital computation unit, a dedicated digital or analog computation unit or a lookup table.

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